

## SPATIAL AND TEMPORAL VARIABILITY OF THE ALEUTIAN CLIMATE

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### **Abstract**

The main objective of this paper is to highlight those characteristics of climate variability that can substantiate the climate hypothesis of the long-term population decline of Steller sea lions. The Aleutian Islands experience a cool, wet, and windy maritime climate. The islands gave the name to one of the most prominent centers of atmospheric action, the Aleutian low. Being statistical in nature, the Aleutian low reflects the position of most frequent storms. The North Pacific storm track normally lies just south of the Aleutians, but may substantially vary from year to year. The direct exposure to the storms results in the frequent occurrence of winds in excess of 50 mph during all but the summer months. Although the Aleutian Islands stretch about 1000 miles across the northern North Pacific, the seasonal changes in surface air temperature (SAT) are relatively uniform, from 40-50F in summer to near freezing temperatures in winter. The interannual and interdecadal variations in SAT, however, are substantially different for the eastern and western Aleutians. The western Aleutians experienced a regime shift toward a warmer climate in 1977, simultaneously with the basin-wide shift in the Pacific Decadal Oscillation (PDO). In contrast, the western Aleutians show a constant decline in winter SATs that started in the 1950s. This negative trend could have affected the productivity of the sea-lion habitat, and thus diminished the abundance or availability of prey for sea lions in the western portion of their range. Another important feature of climate variability in the region is the regime shift around 1989, which was statistically significant over the western Gulf of Alaska. Even more prominent shift toward colder temperatures in the region occurred in 1999, which was a manifestation of a broadly debated possible shift in the PDO. A significantly colder regime of 1989-2002 compared to that of 1977-1988 may help to explain the decline in Steller sea lion pup counts on rookeries in western Gulf of Alaska and eastern Aleutian Islands. No temperature decline was observed along the North American coast from the eastern Gulf of Alaska southward where the population of sea lions remains stable.